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Olivocerebellar circuit. Structure and functions

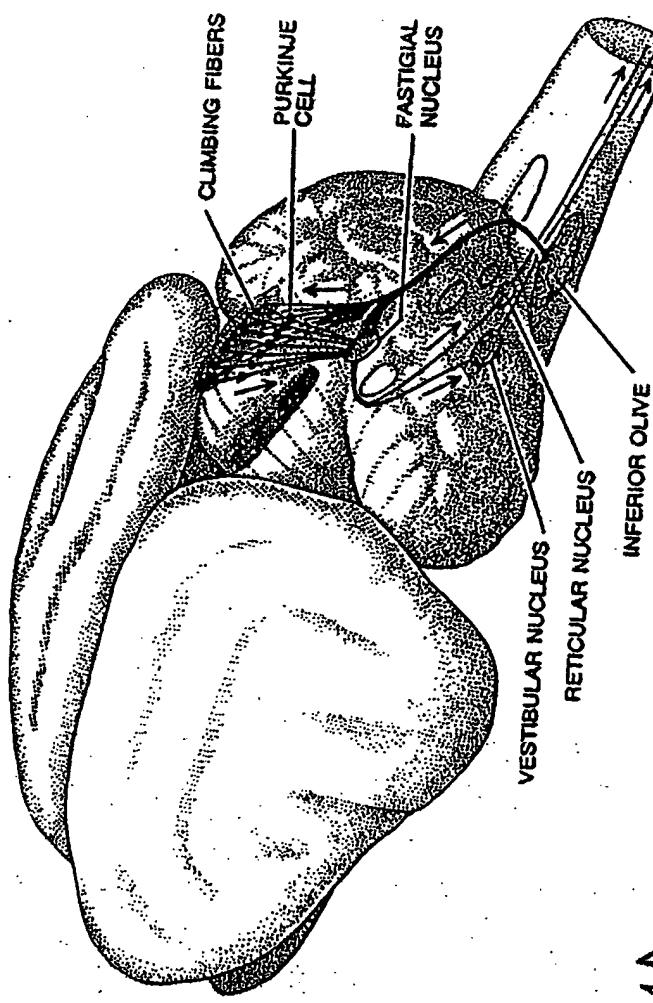


FIG. 1A

Olivocerebellar feedback loop.

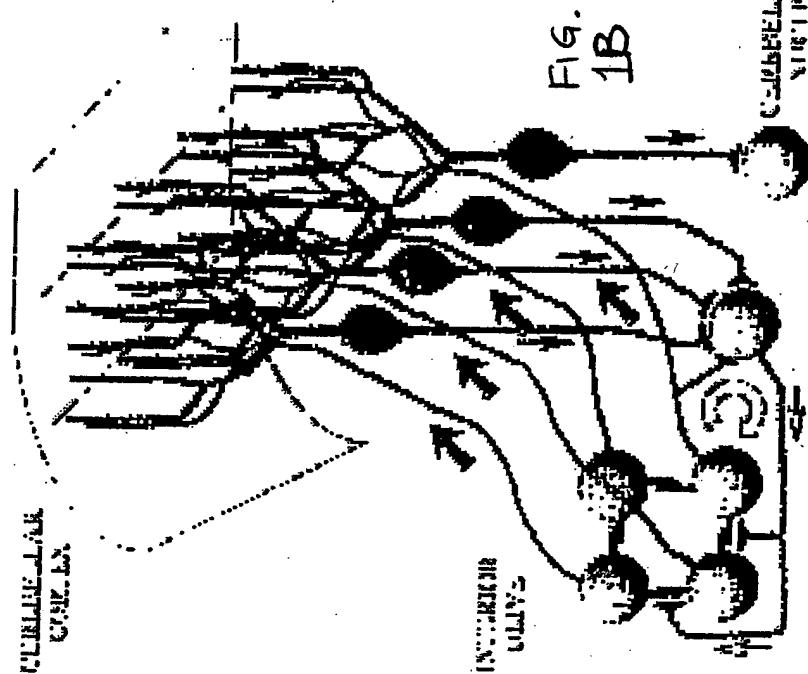


FIG. 1B

Functional circuit.

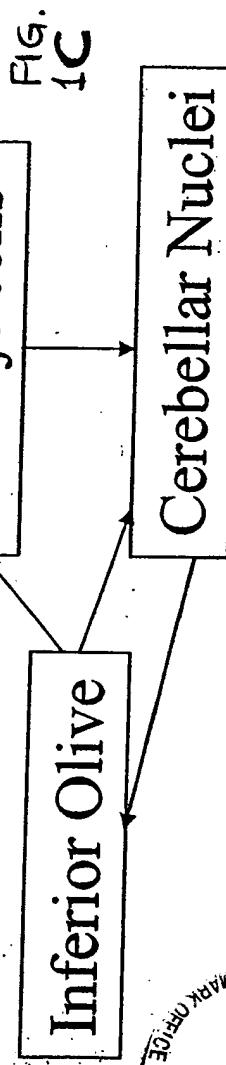


FIG. 1C



FIG. 2A

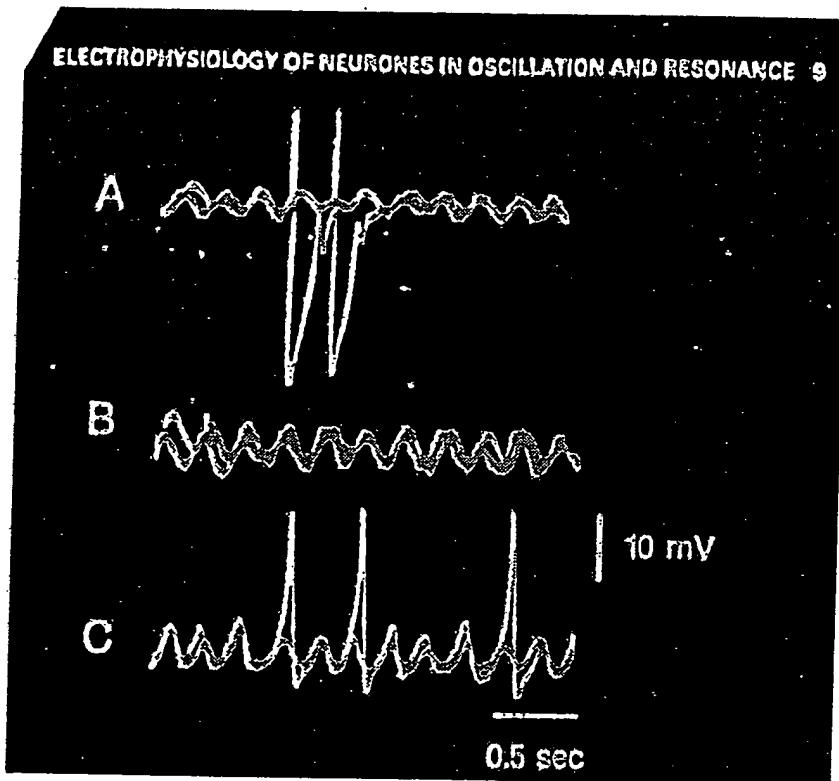


FIG. 2B

FIG. 2C

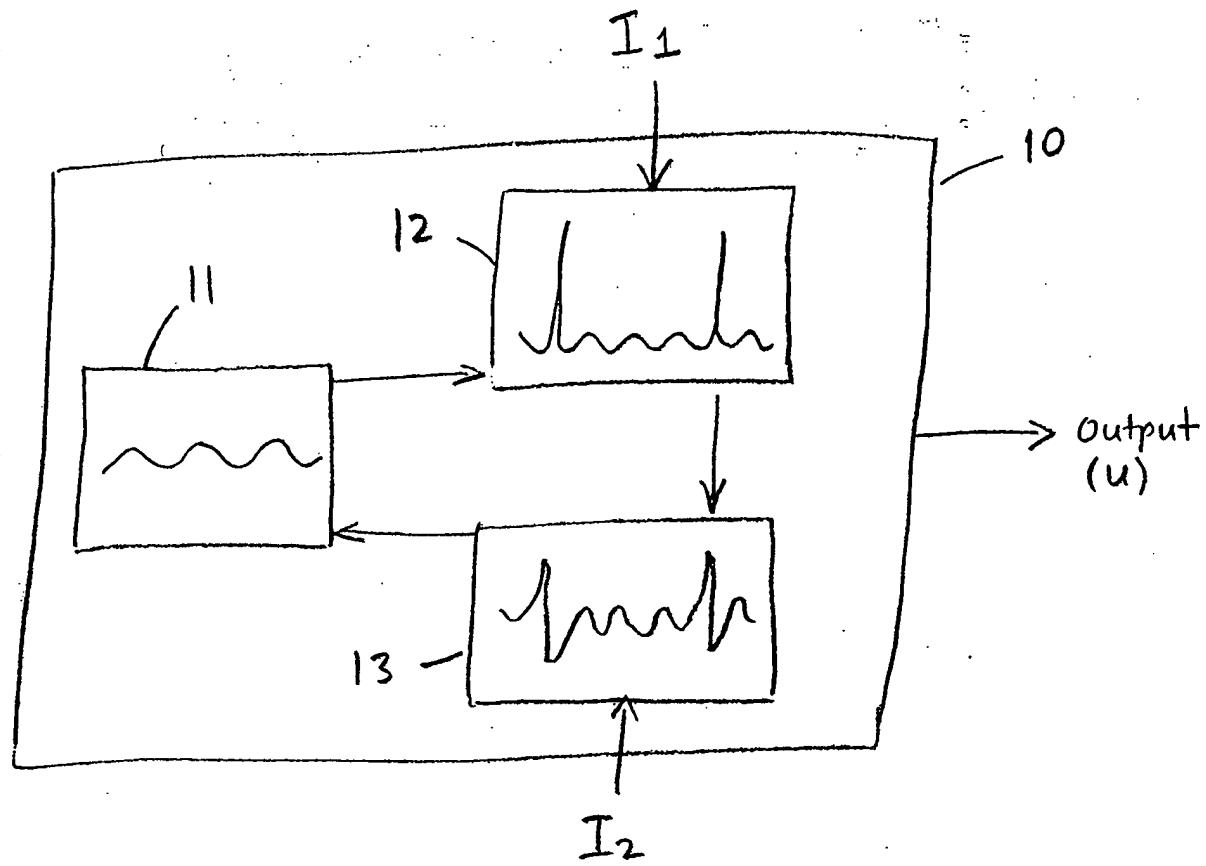
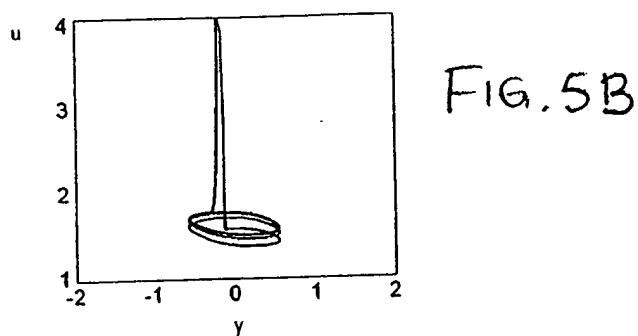
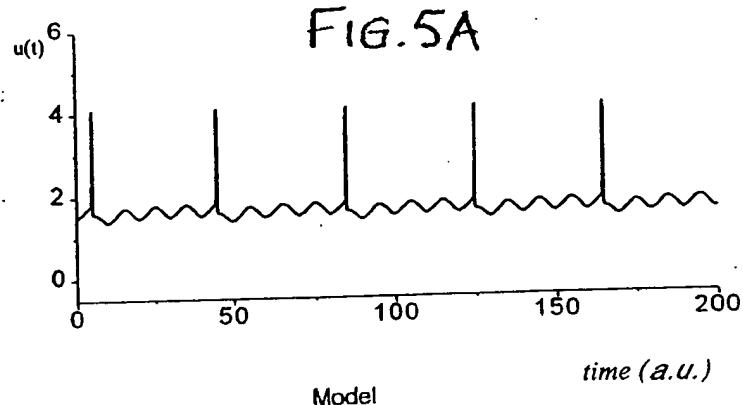
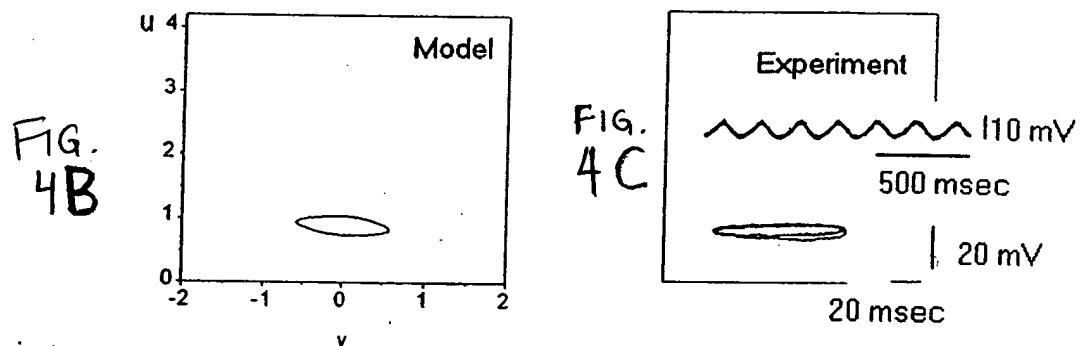
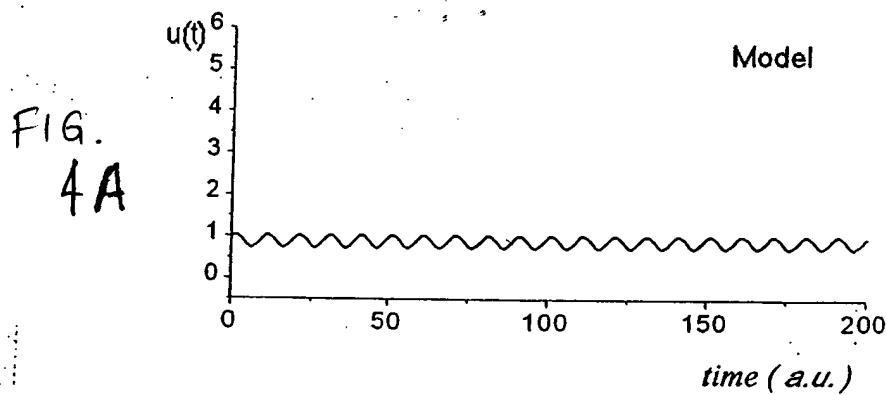
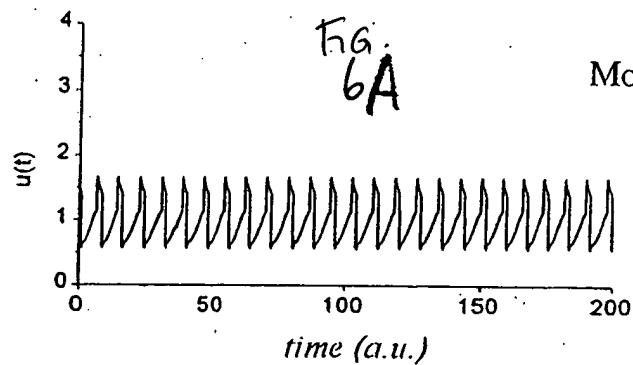
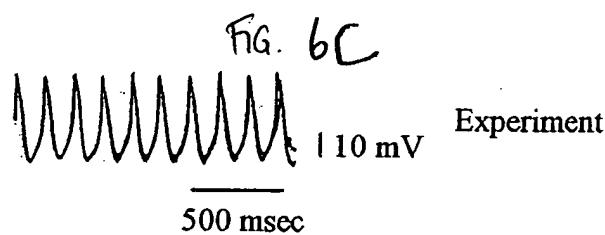
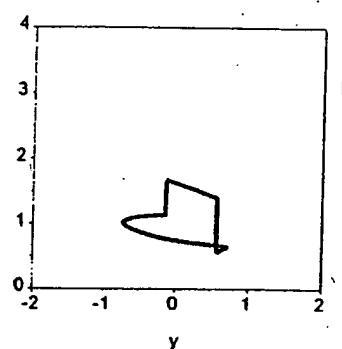


FIG. 3

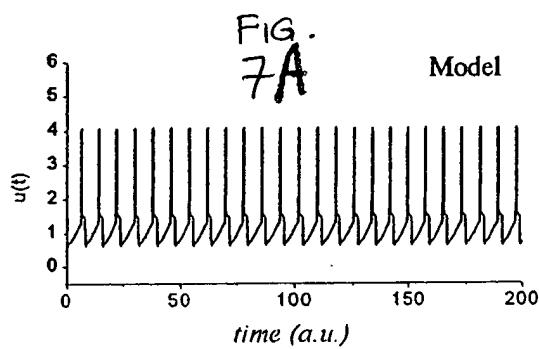
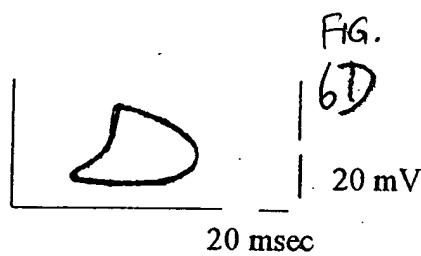




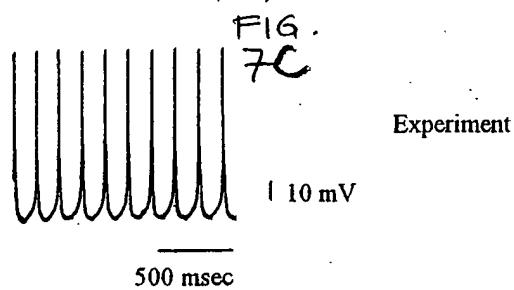
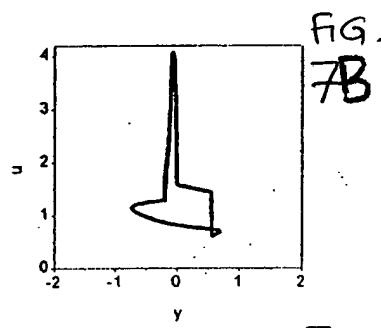
Model



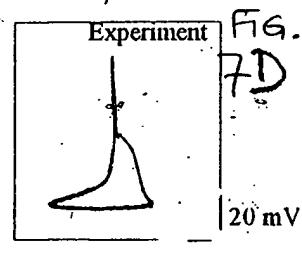
Experiment



Model



Experiment



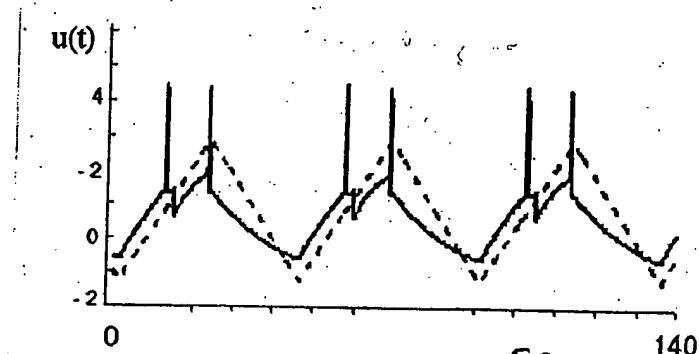


FIG. 8A

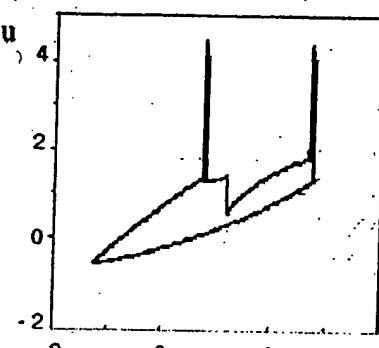


FIG. 8B

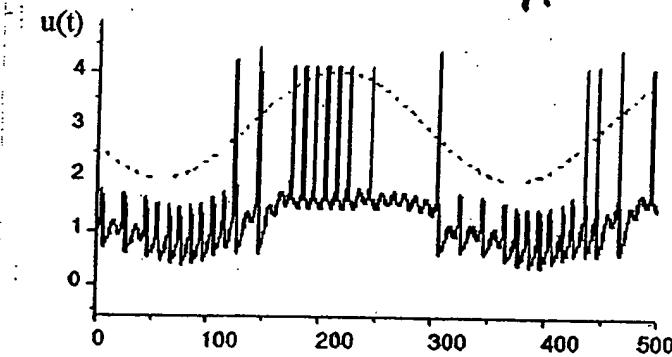


FIG. 8D

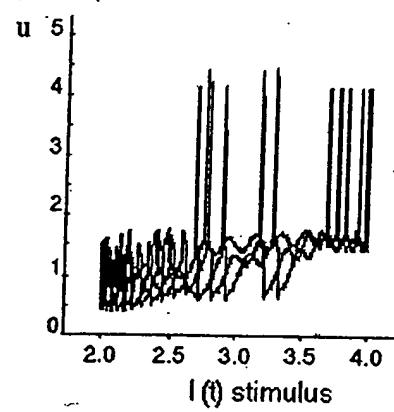


FIG. 8E

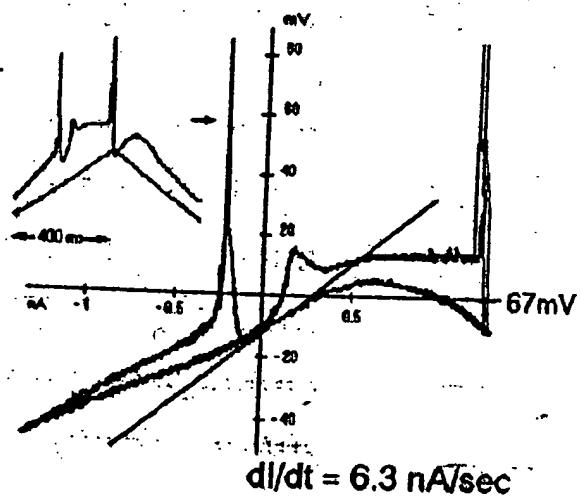
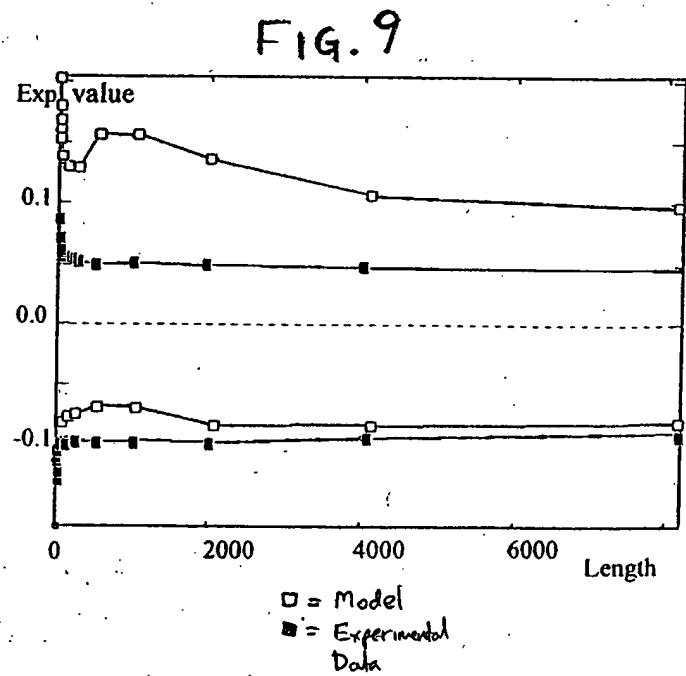


FIG. 8C



Block-diagram of the circuit

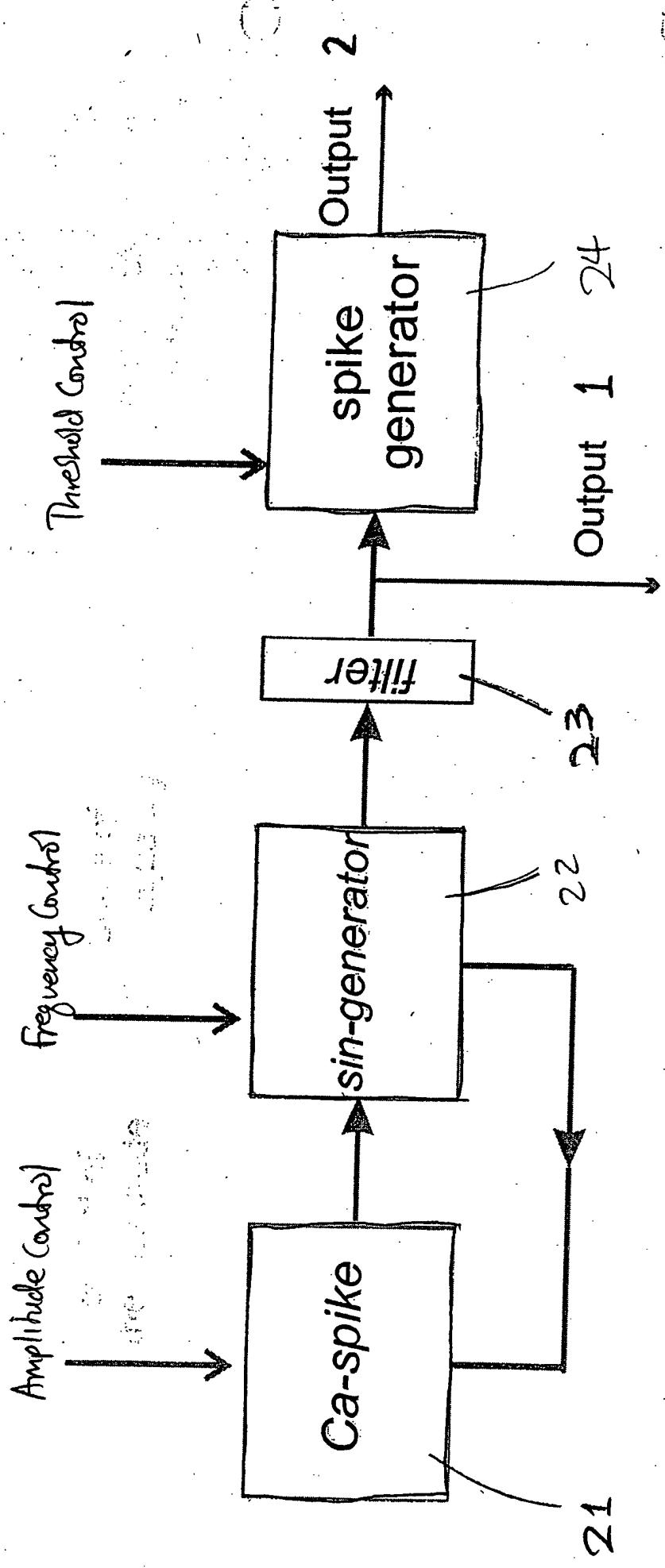


FIG. 10

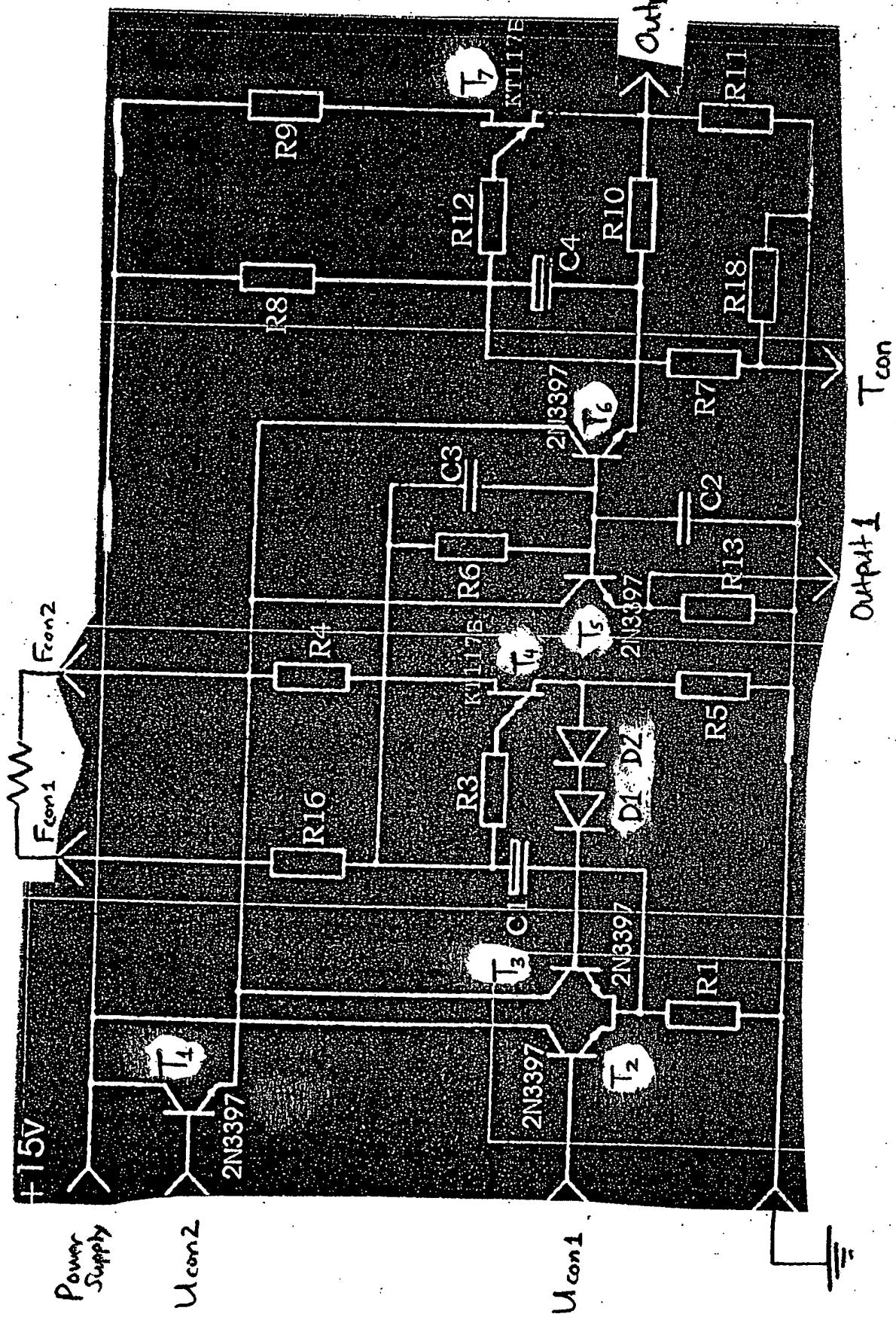


FIG. 11

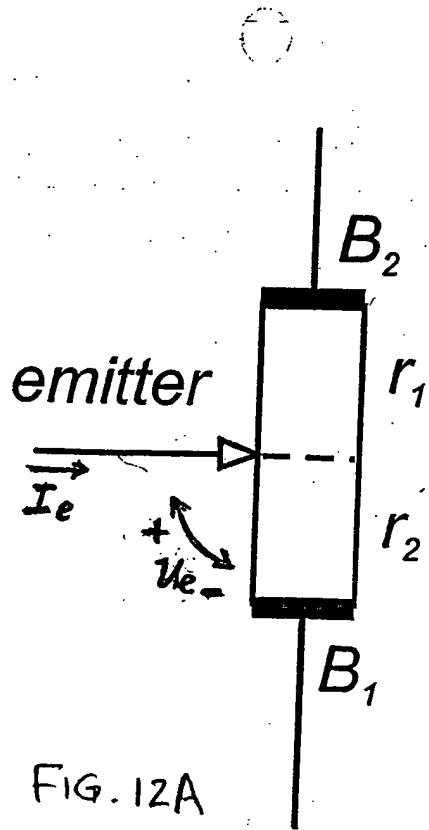


FIG. 12A

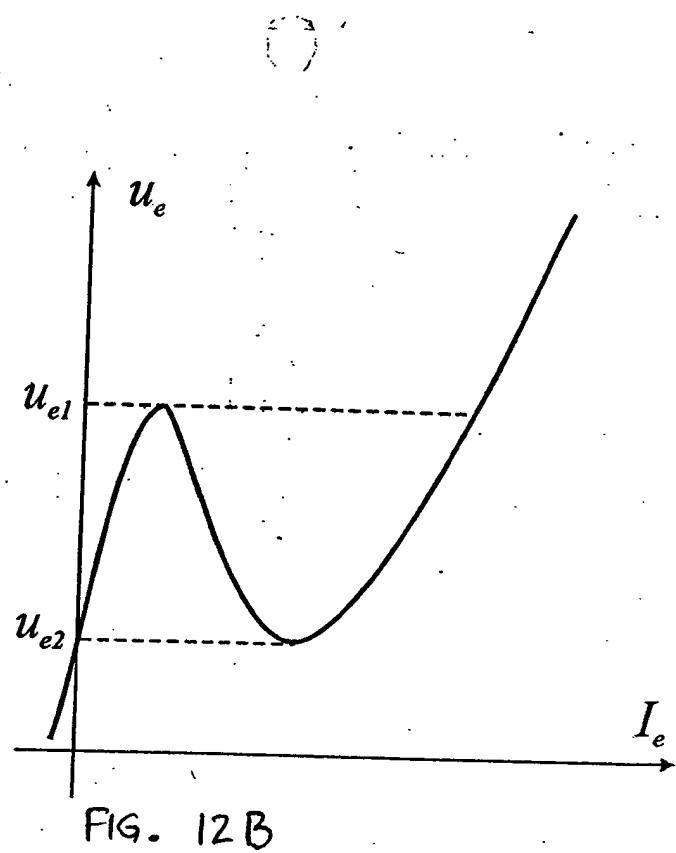


FIG. 12B

Two chip experiments

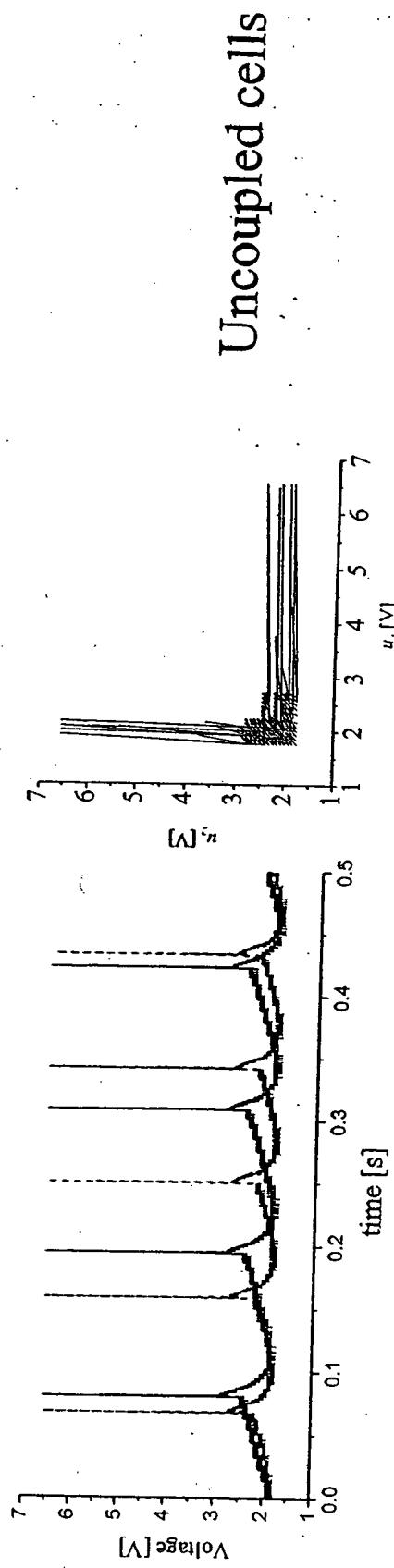


Fig. 13A

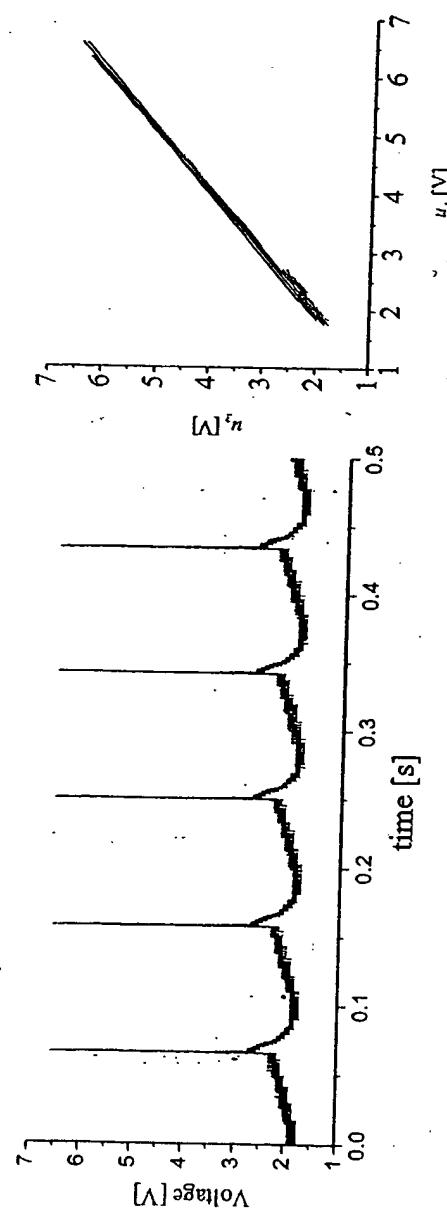
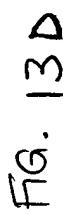


FIG. 13C



Synchronization



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Synchronous and asynchronous spiking

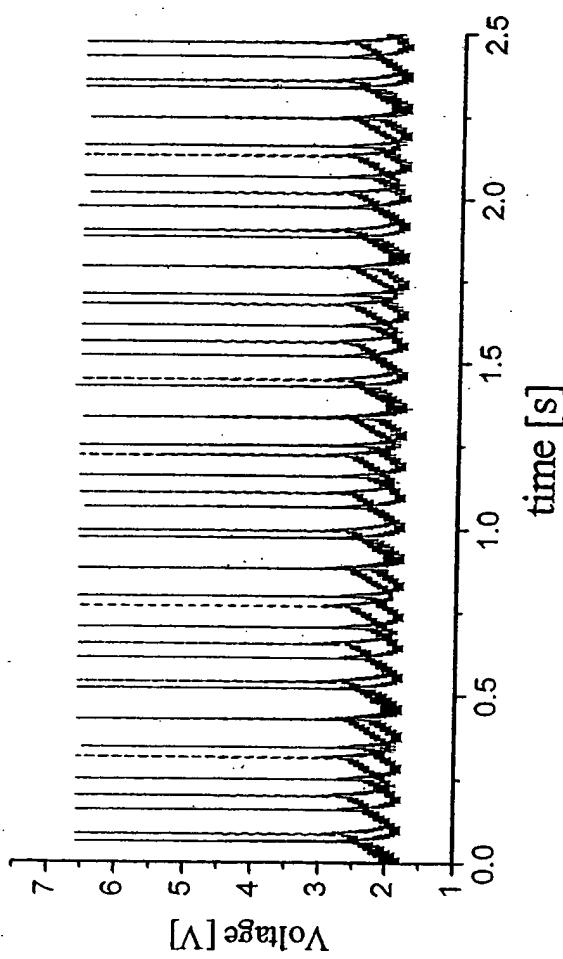


FIG. 14A

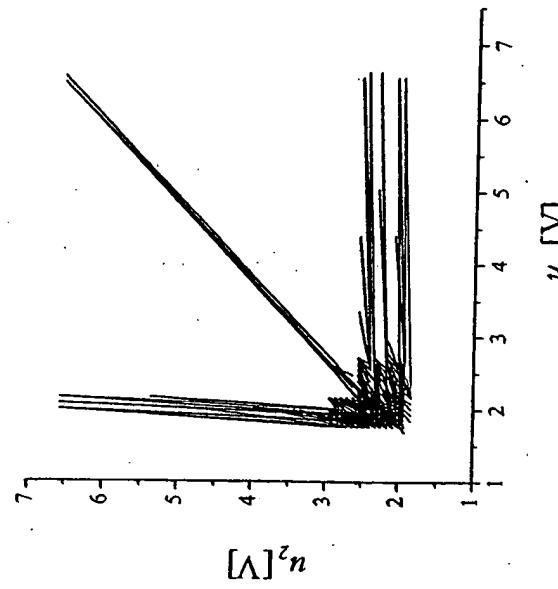
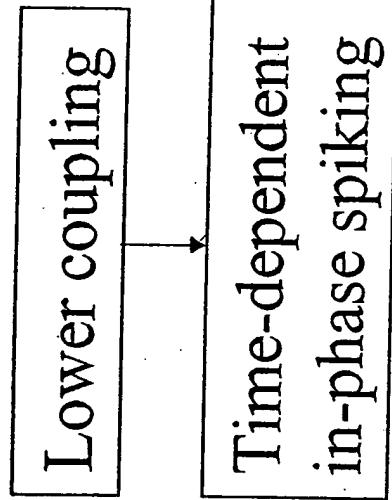


FIG. 14B



10001

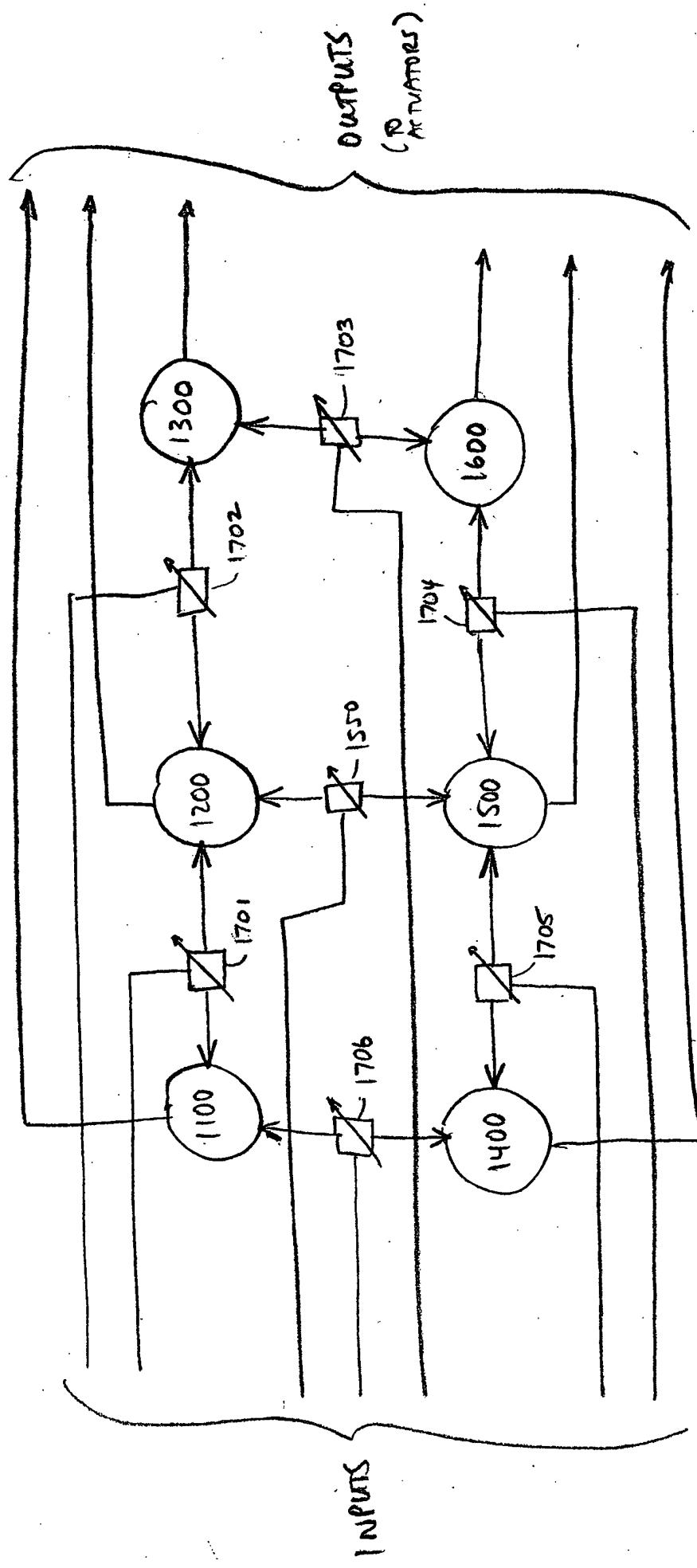


FIG. 15

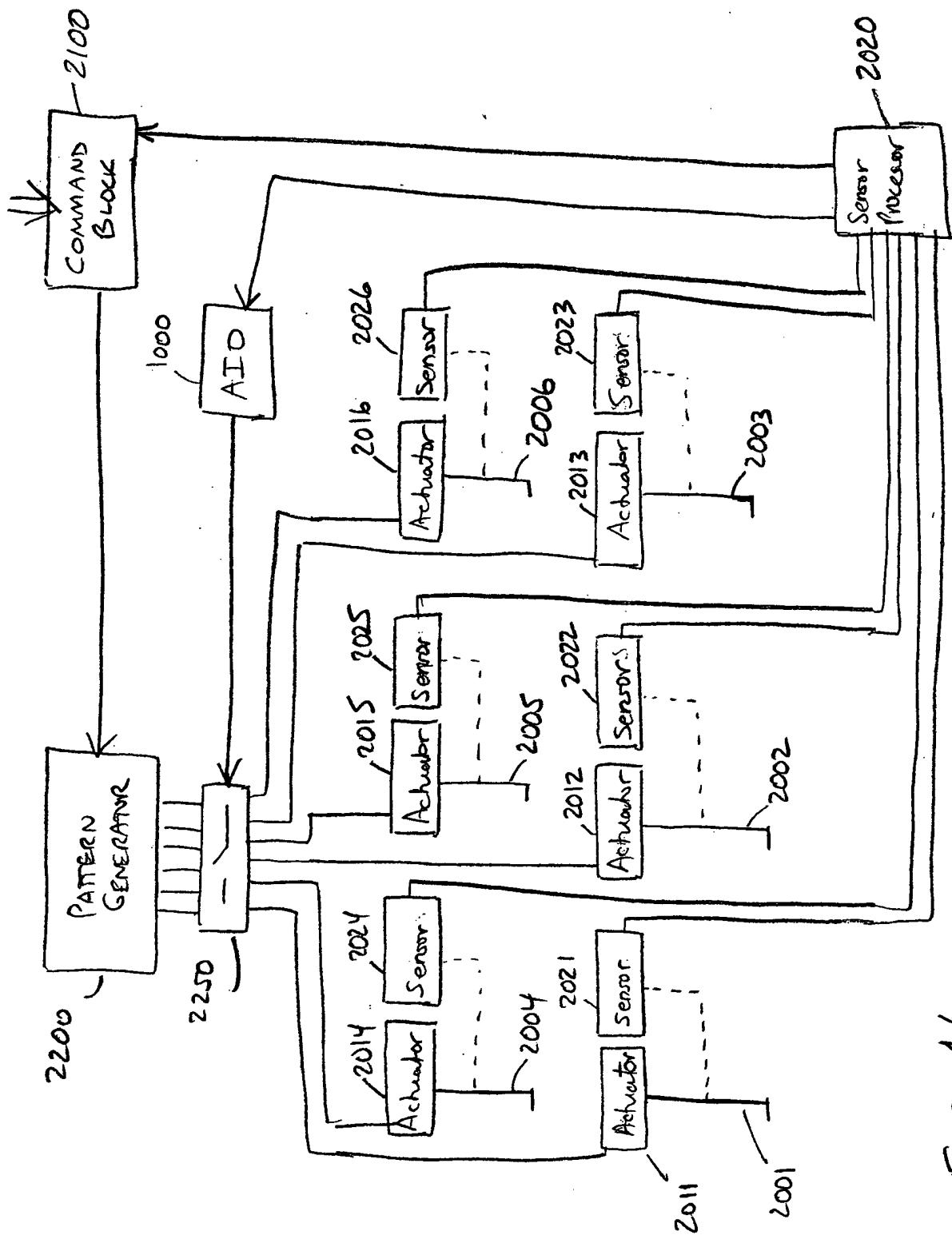


FIG. 16

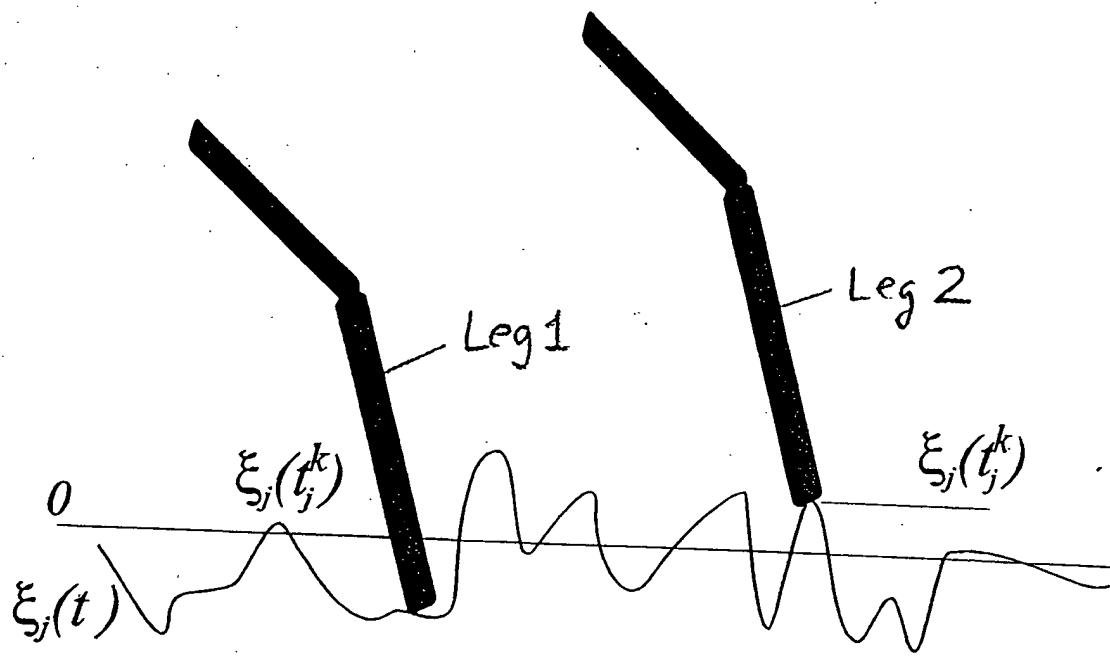


FIG. 17

Global phase coordination

FIG.
18A

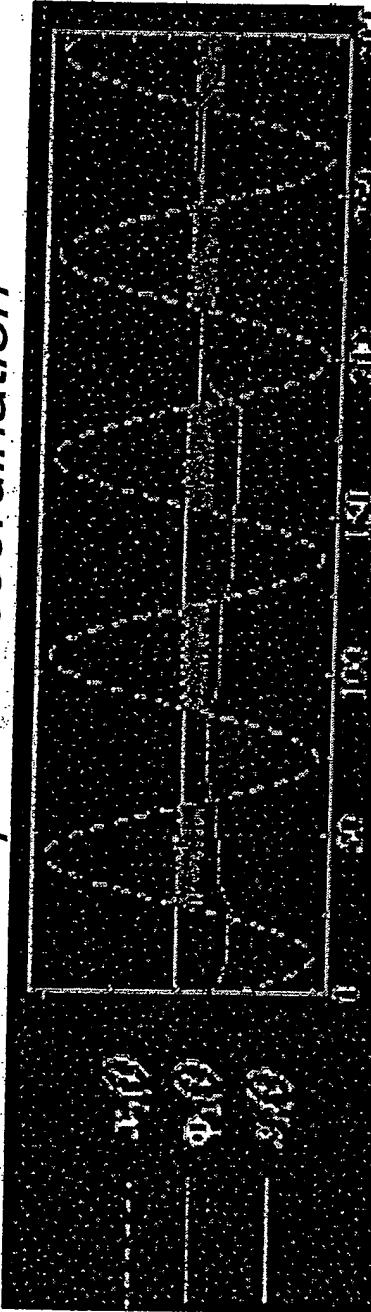


FIG.
18B

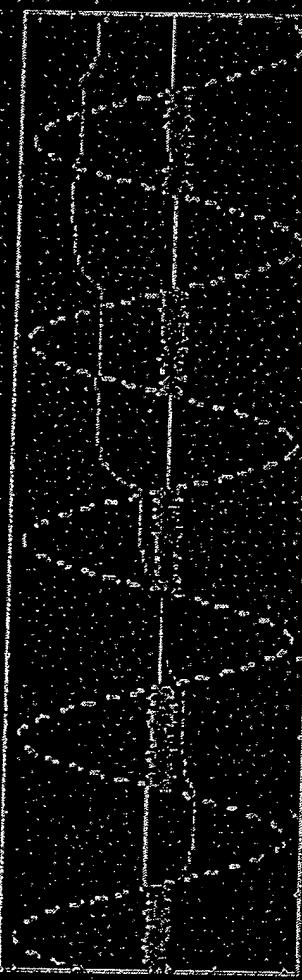
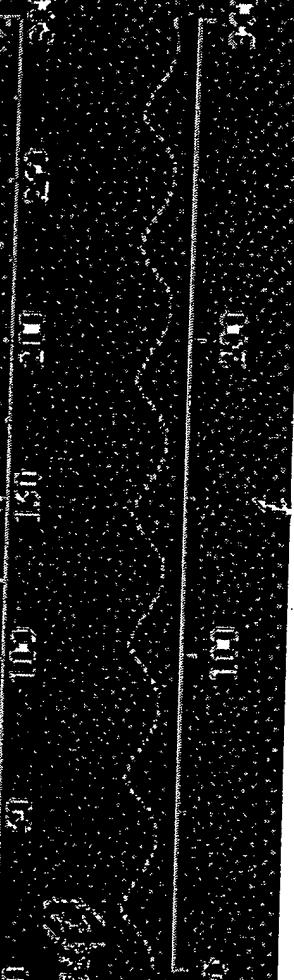


FIG.
18C



No control

Coordination with discrete control

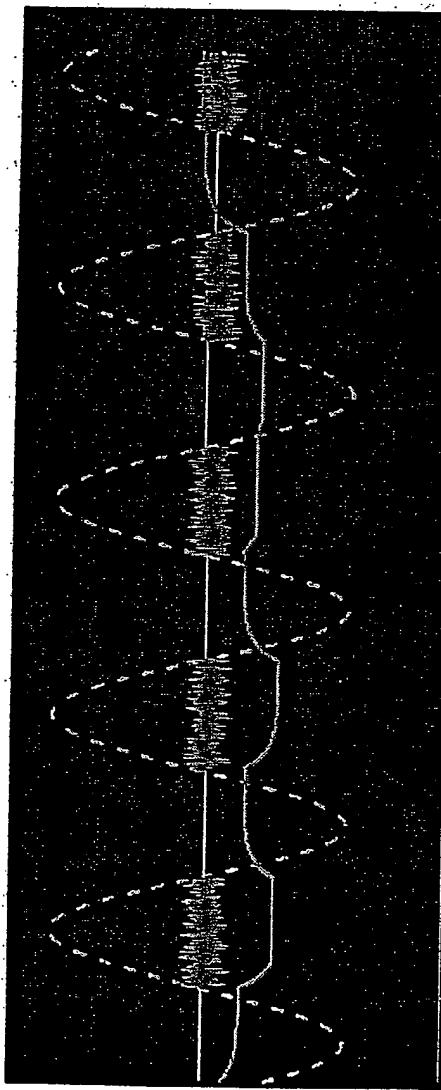


FIG.
19A

The control signal recovers
the correct phase shift
relations

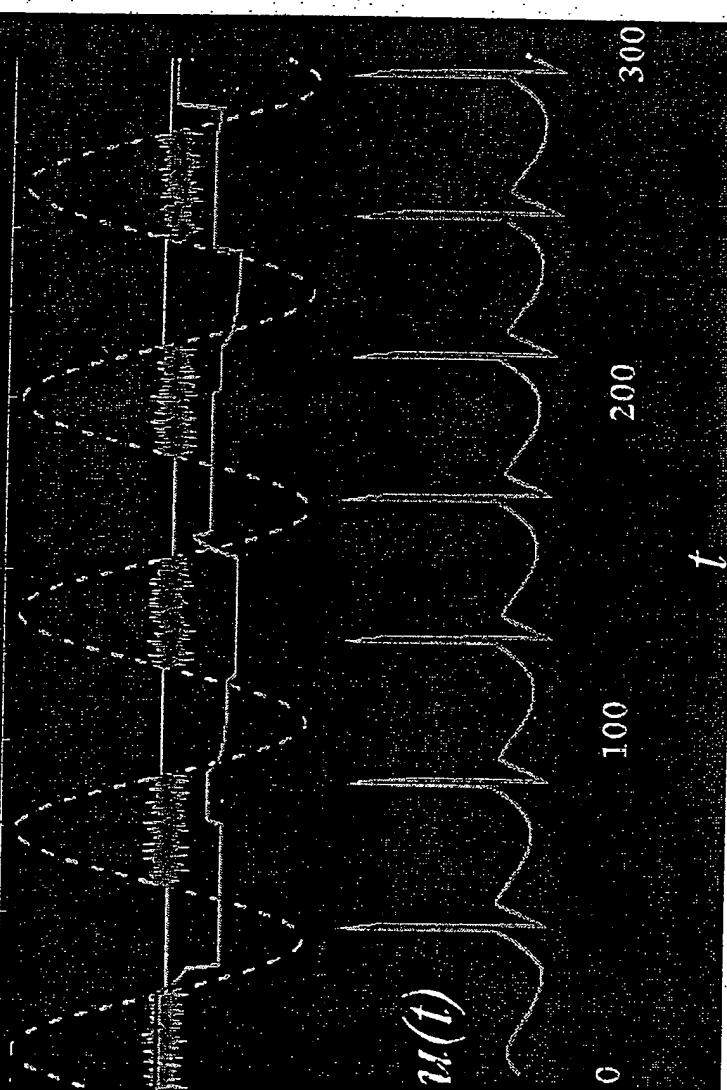
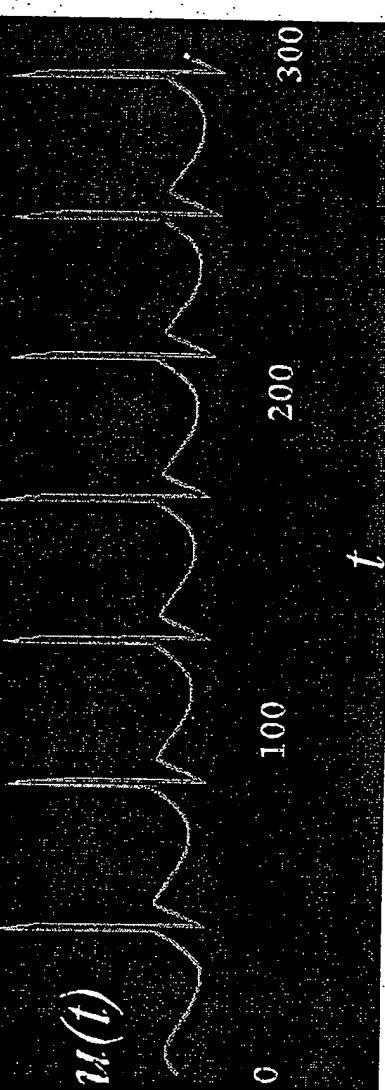
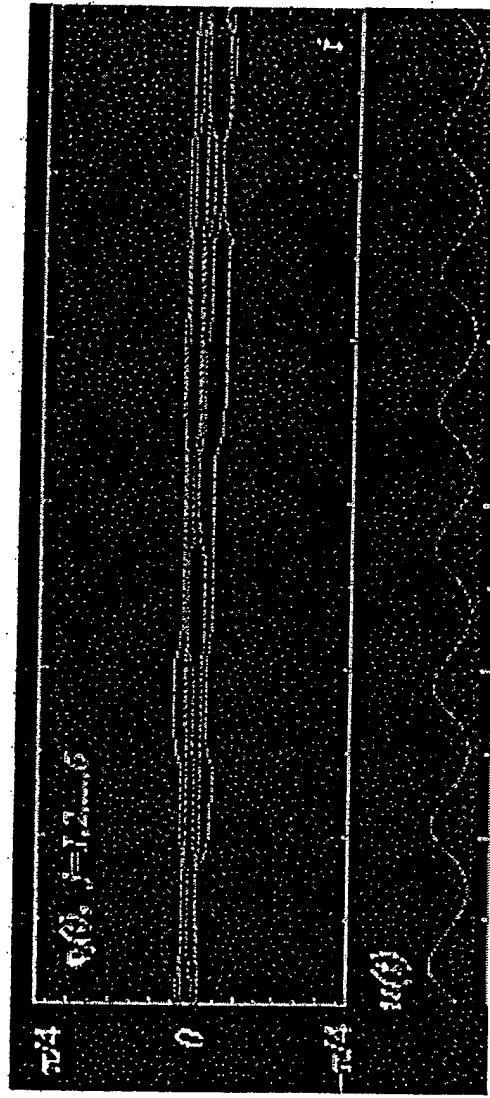


FIG.
19B

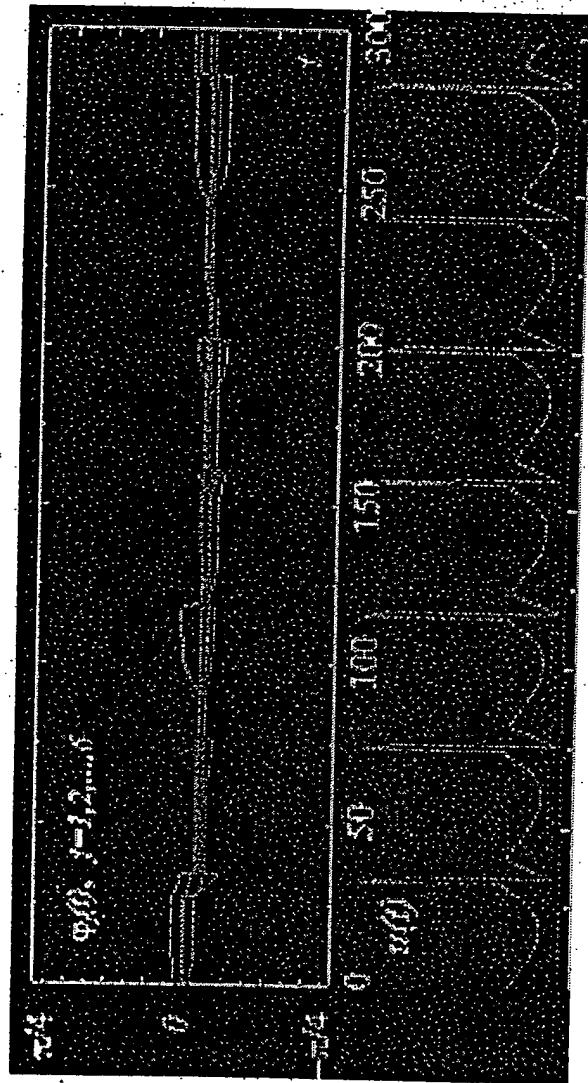
FIG.
19C



Evolution of phases



No control – phases
evolve according to self-
tuning mechanisms



Discrete control – the
movement is controlled to
sustain the walking gate

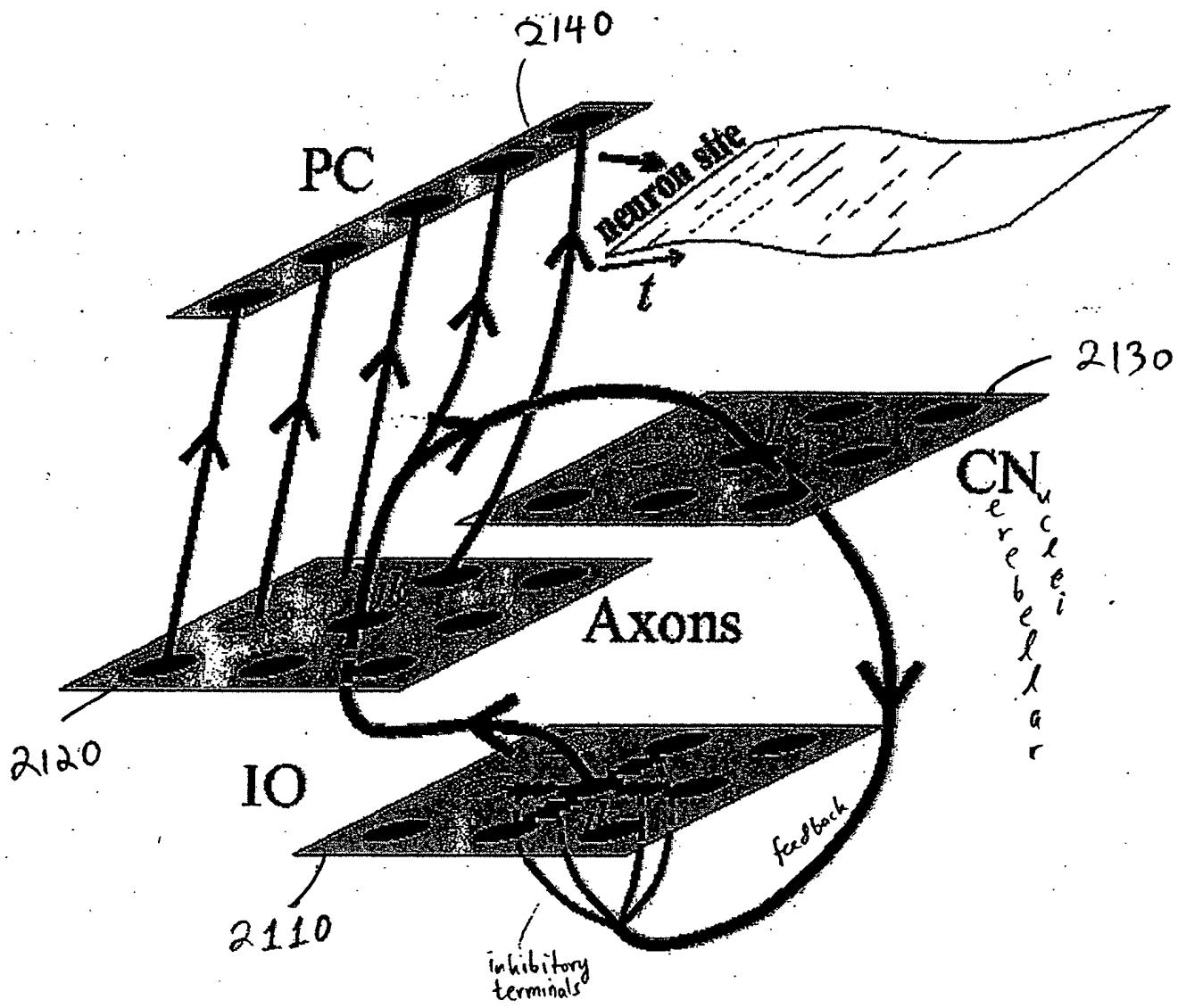


Figure 21

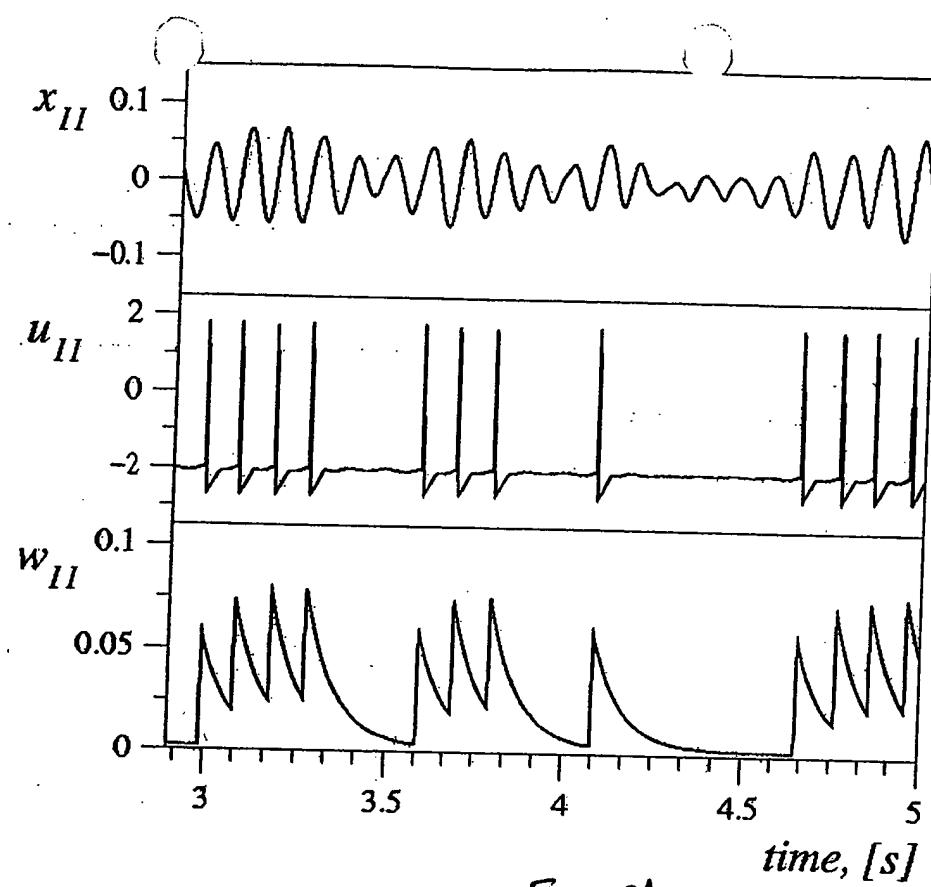


FIG. 22A

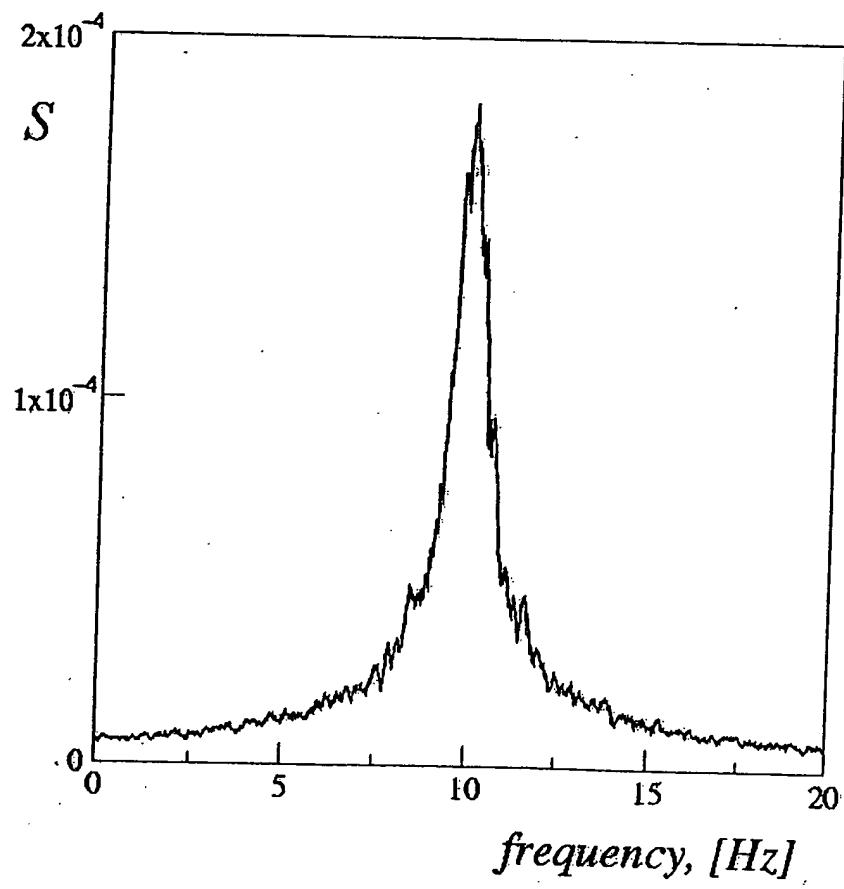


FIG. 22B

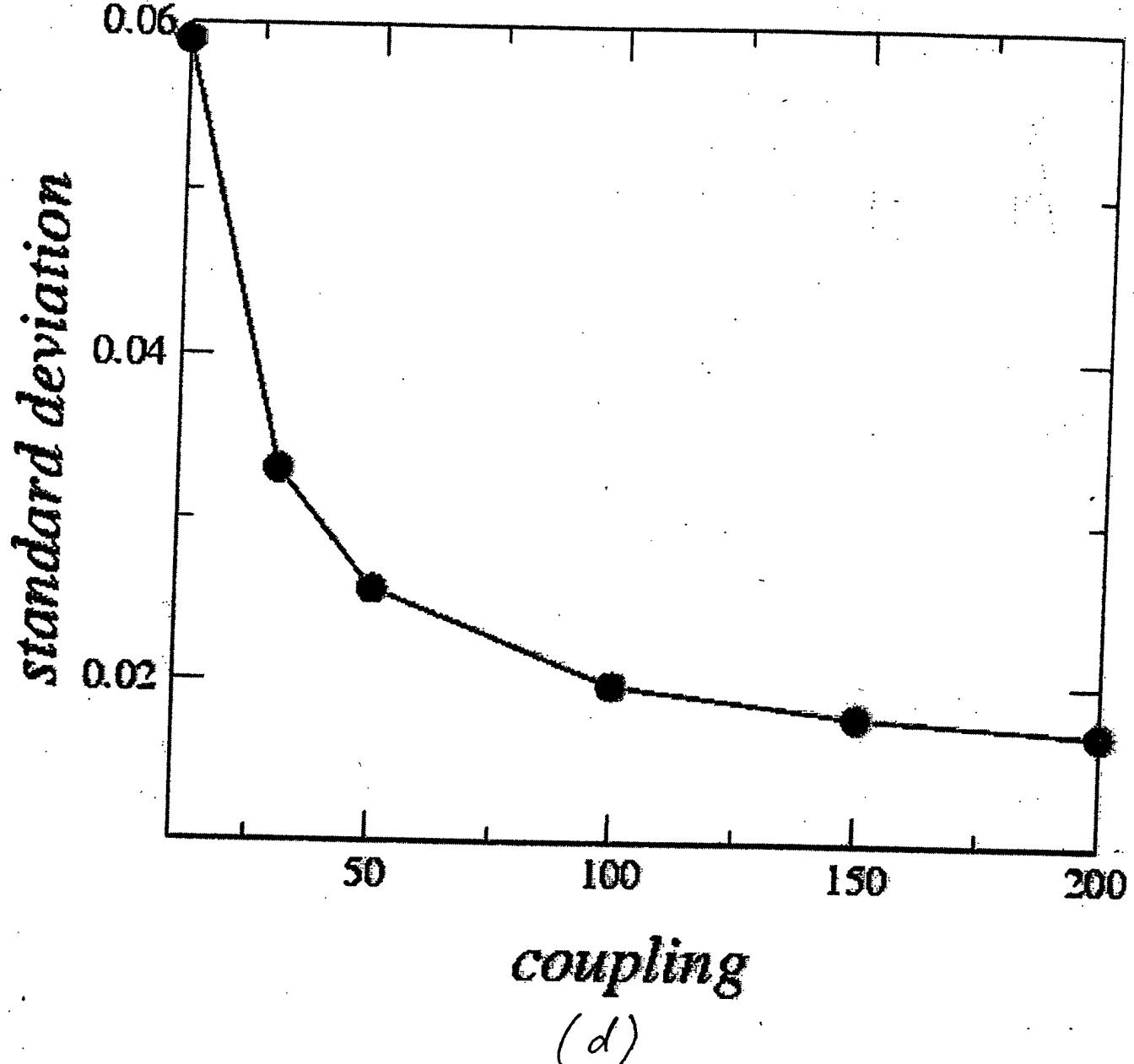


Figure 23

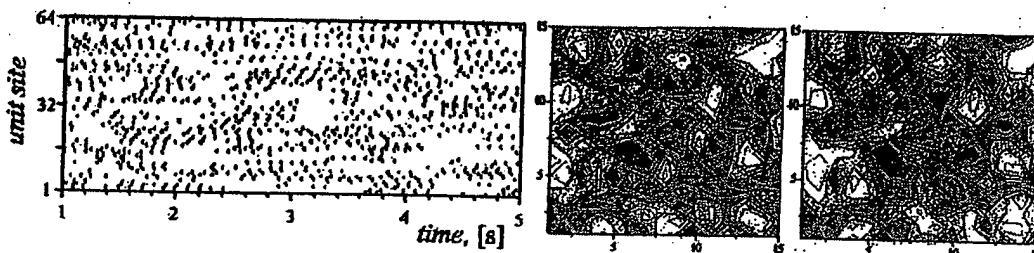


FIG. 24A

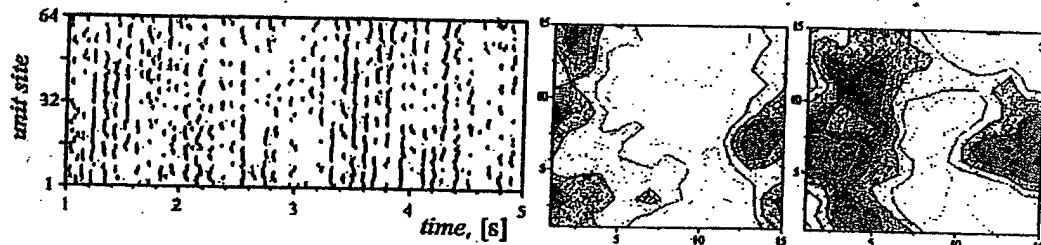


FIG. 24B

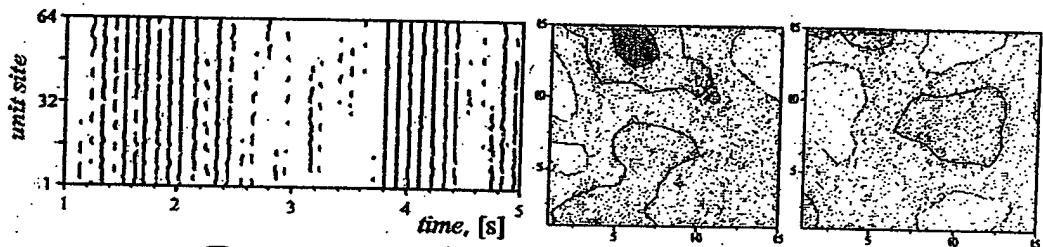


FIG. 24C

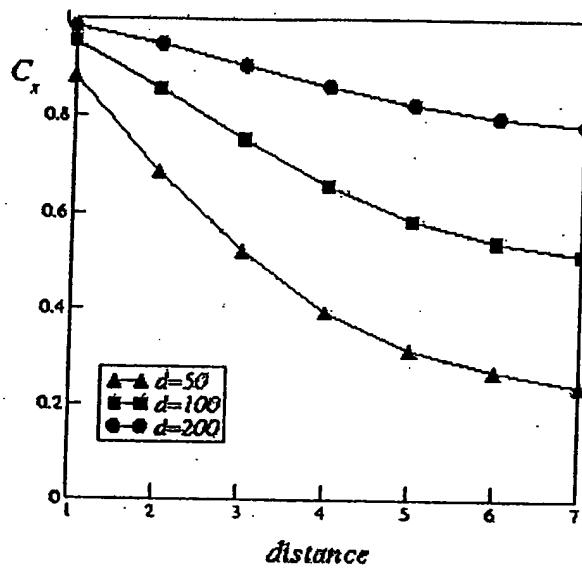


FIG. 25A

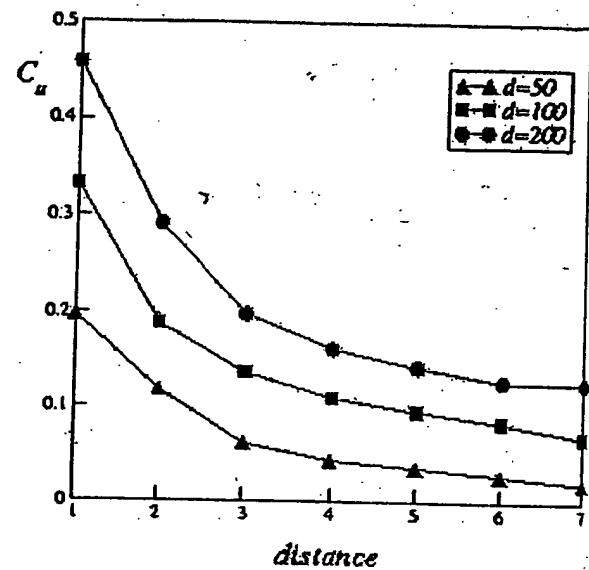


FIG. 25B

w_{II}

FIG. 26A

w_{I2}

FIG. 26B

d_{I2}^{II}

Fig. 26C

7 8 9 10 11 12

time [s]

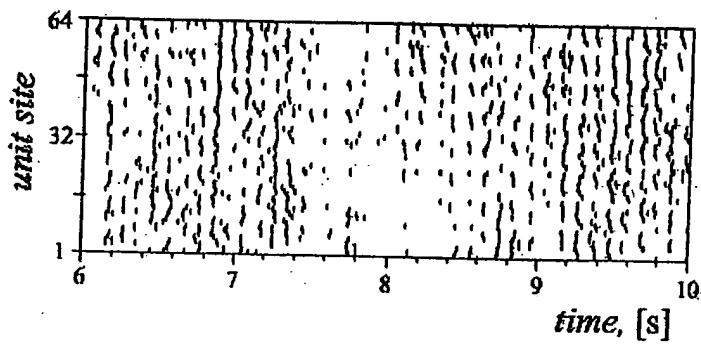


FIG. 27A

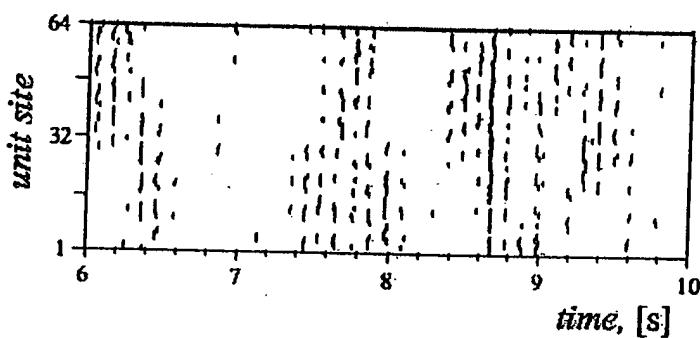


FIG. 27B

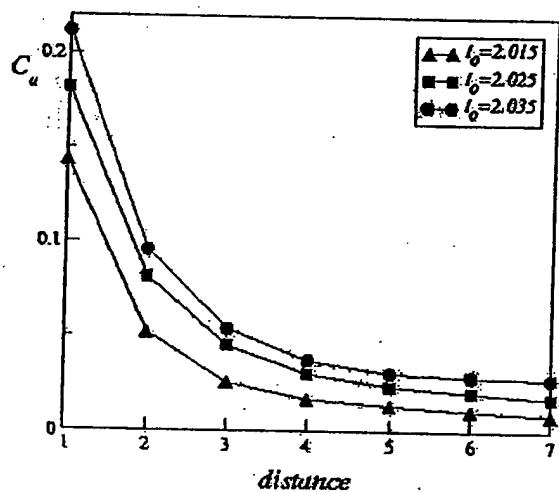
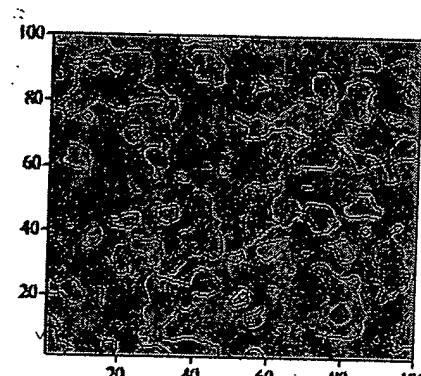
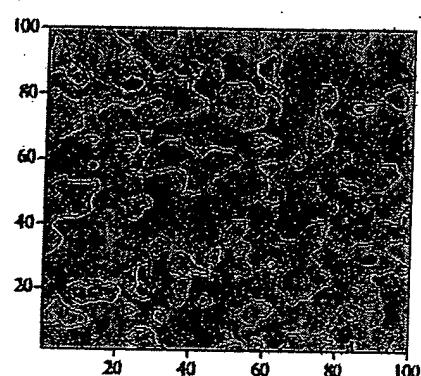
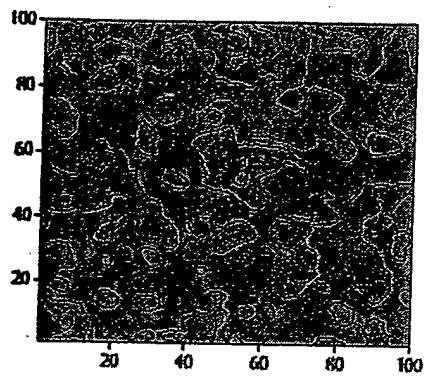
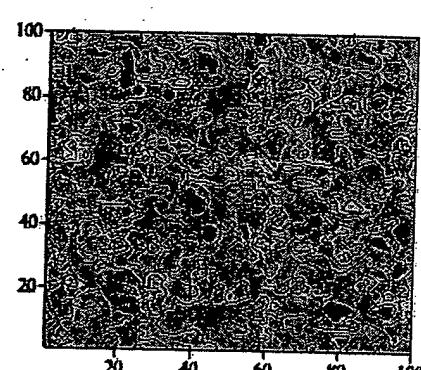
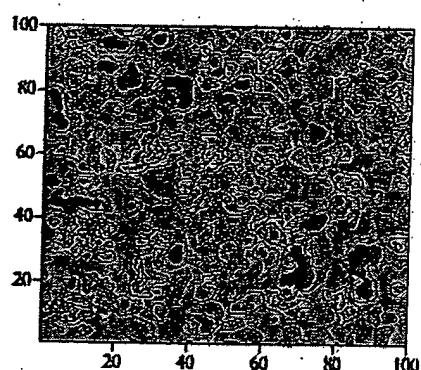
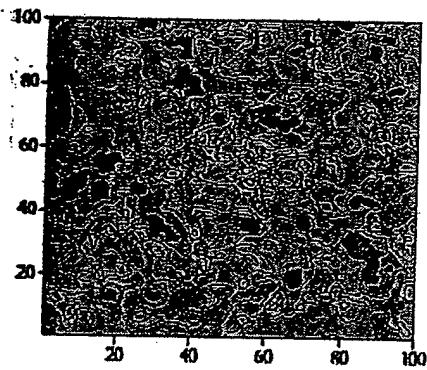


FIG. 27C



- constant
coupling
- no feedback
($\Gamma = \phi$)

FIG. 28A



feedback
 $\Gamma \neq \phi$

FIG. 28B

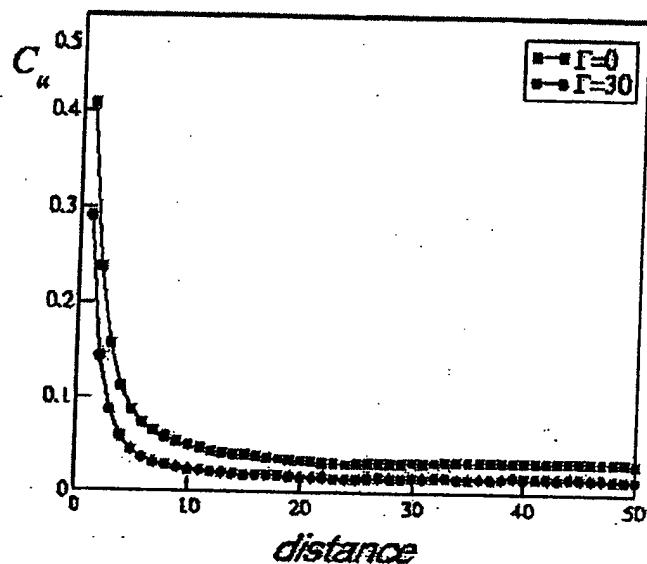


FIG. 29A

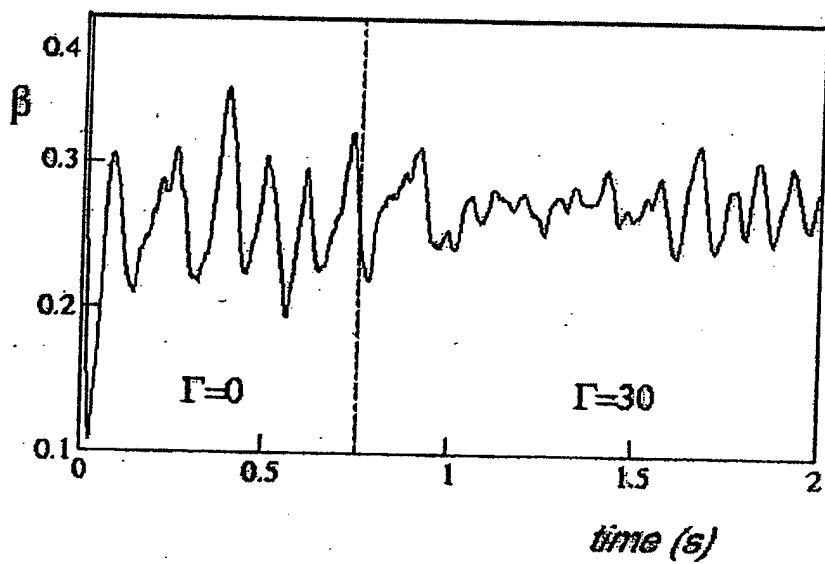


FIG. 29B

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FIG. 30A

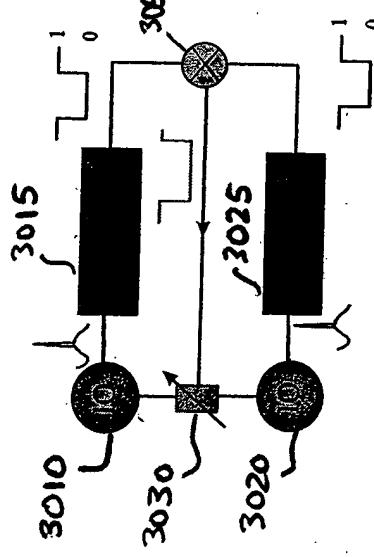
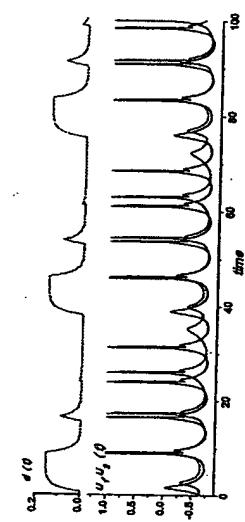


FIG. 30B



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82

FIG. 31A

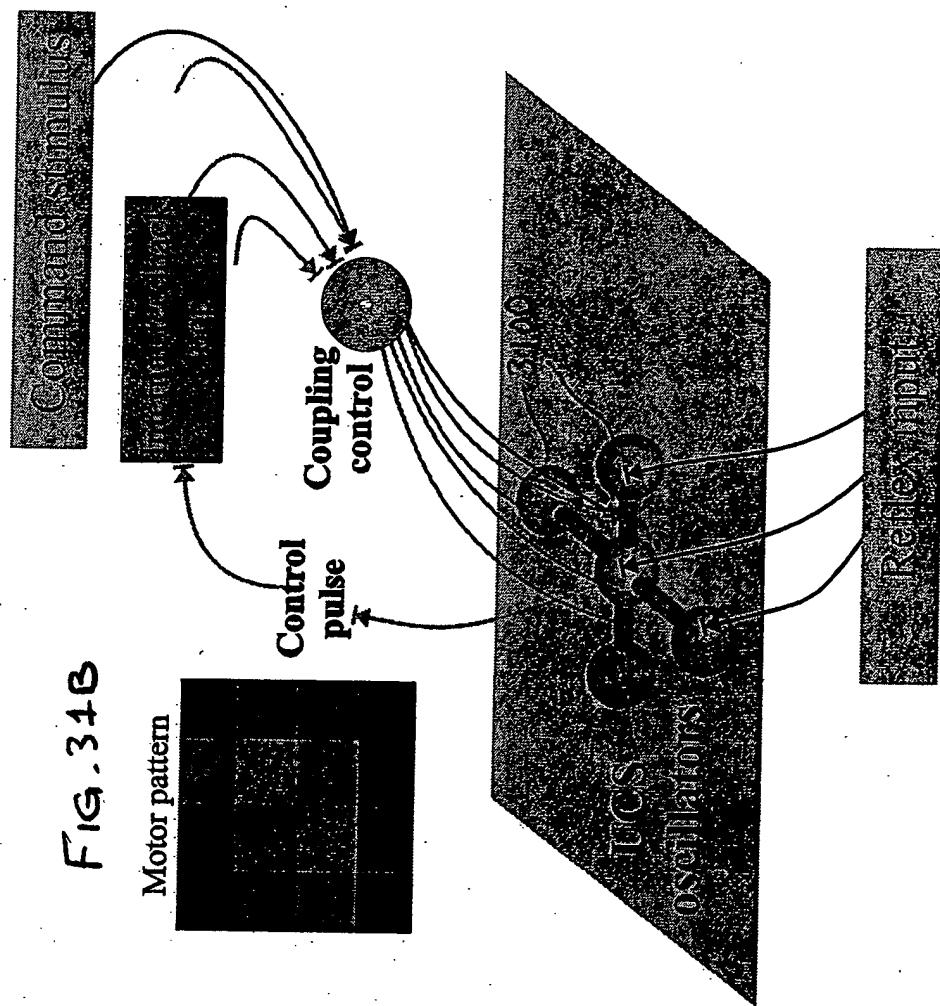


FIG. 31B

FIG. 32A

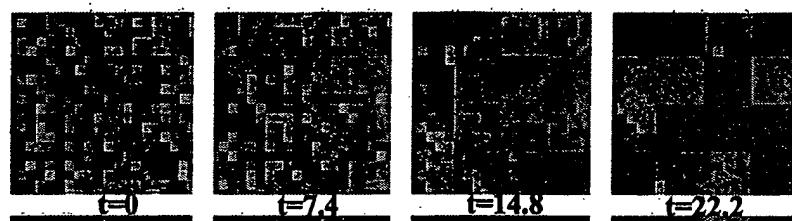


FIG. 32B

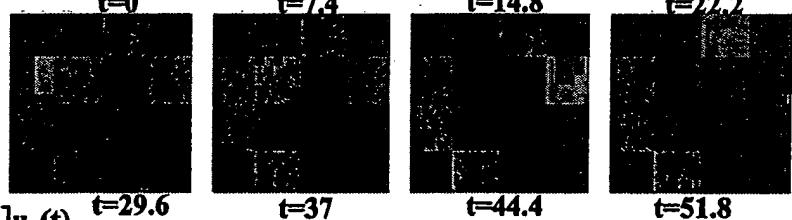


FIG. 32C

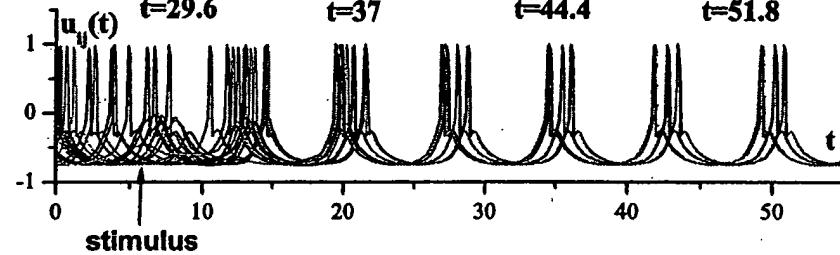


FIG. 33A

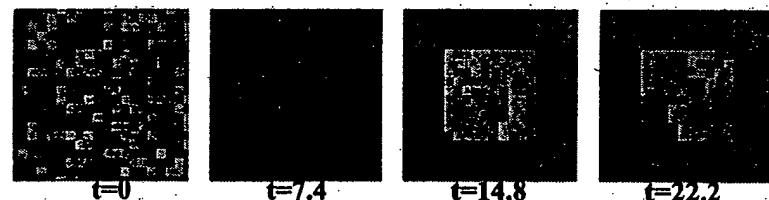


FIG. 33B

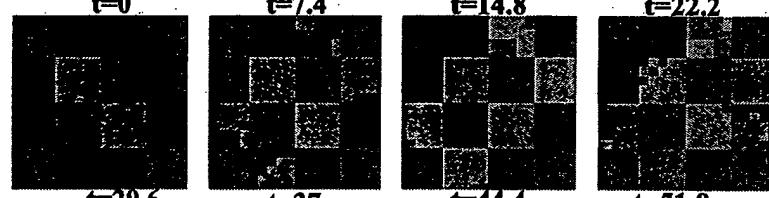


FIG. 33C

